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which will be consulted by students for generations to come. The other three great collections are to be found at the Museum of Comparative Zoology, at Cambridge, Mass.; the Academy of Natural Sciences, at Philadelphia, Pa.; and the U. S. National Museum, Washington, D. C.

L. O. HOWARD.

SCIENTIFIC BOOKS.

American Hydroids, Part I, The Plumularidæ.

By C. C. NUTTING. Washington, 1900.

Published by the Smithsonian Institution.

Pp. 285; pls. 34.

We are accustomed to think of social life and the division of labor as being especially characteristic of highly organized beings, such as ourselves among the vertebrates, and the ants among the arthropods; but as a matter of fact socialism was invented and put into practice very early in the history of terrestrial life, among creatures not so very far removed from the most primitive types known to us. Professor Nutting, in the splendid monograph now under review, tells us (p. 46) that "Hydroids are exceedingly low in their organization and exhibit in several respects the appearance of loosely aggregated assemblages of cells which are individually much like protozoa," and yet he describes and figures the wonderfully differentiated individuals or 'persons' which make up the beautiful and complicated feather-like colonies of these animals. That there would be some differentiation for reproductive ends we might well expect, but the Plumularidæ keep a standing army of remarkably constituted individuals, supported by the common purse, and fighting for the common weal. Listen here to Professor Nutting:

"As to the morphological significance of the sarcostyles, all of the more recent authorities, except Jickeli, regard them as degenerate individuals of the colony, or as 'fighting persons.' That they are individuals or 'persons' is a matter hardly admitting of doubt; but it may well be questioned whether they are *degenerate* persons or not, and an argument might be constructed which would go to show that instead

of being degenerate individuals they are in fact very highly specialized persons. Specialization is indicated when the structure has departed from the original type in order to become adapted to more definite and exclusive function. It would seem that the sarcostyles have done this very thing—departed from the original type (*Protohydra* ?), and become morphologically differentiated into individuals having the definite function of defense, in most cases, and of prehension by means of adhesive cells 'in others' (p. 28).

All of which teaches us that, after all, living protoplasm is the wonderful thing; granting it, the varied and complicated manifestations of life may be said to follow naturally and inevitably, their extent and variety dependent on warmth and moisture, time and space, but their essential nature what it was when life first appeared upon the earth.

These things may sound trite; but while we talk glibly of differentiation and evolution, we do not always descend from the abstract to the concrete, and realize the actual facts. Professor Nutting's monograph should have this value to the general zoologist and the teacher of science, that it brings them as nearly into contact with the things themselves and their way of life as may be possible without a prolonged and special study of the group. The study of types may give us a certain knowledge of structure, but without a real insight into life-histories, we miss most of the fun, and may therefore be thankful to be invited to partake of the provender so laboriously gathered for our benefit.

In 1862, the elder Agassiz recognized only three Plumularidæ from the coasts of the United States. To-day Professor Nutting makes us acquainted with 121 American species, eight of which, however, are not found north of the Isthmus of Panama. Of the 121, no less than 52 have been first made known by Professor Nutting himself. Most of the species come from the West Indies, and it seems rather remarkable that only ten are reported from the whole Pacific coast of North America. Surely more careful collecting off the coasts of Southern and Lower California should bring to light a number of new forms.

T. D. A. COCKERELL.